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THE SILVER MOUNTAINS OF UTAH.

TEMPLES OF THE RIO VIRGEN, SOUTHERN UTAH.

CAN any good come out of Utah? We have heard enough of spiritual wives and materialistic husbands, of the conflict between Mormon morals and Gentile laws—so much, indeed, that many are ready to conclude that the Territory possesses nothing of interest save the phenomena of a morbid religious development. Leaving these doctrines of unrighteousness, let us consider the many things in Utah which interest without giving pain. We have for this survey an embarrassment of riches: lofty mountains covering two-fifths of the whole Territory, 20,000 square miles of alkali desert, and wild cañons rich in natural beauty

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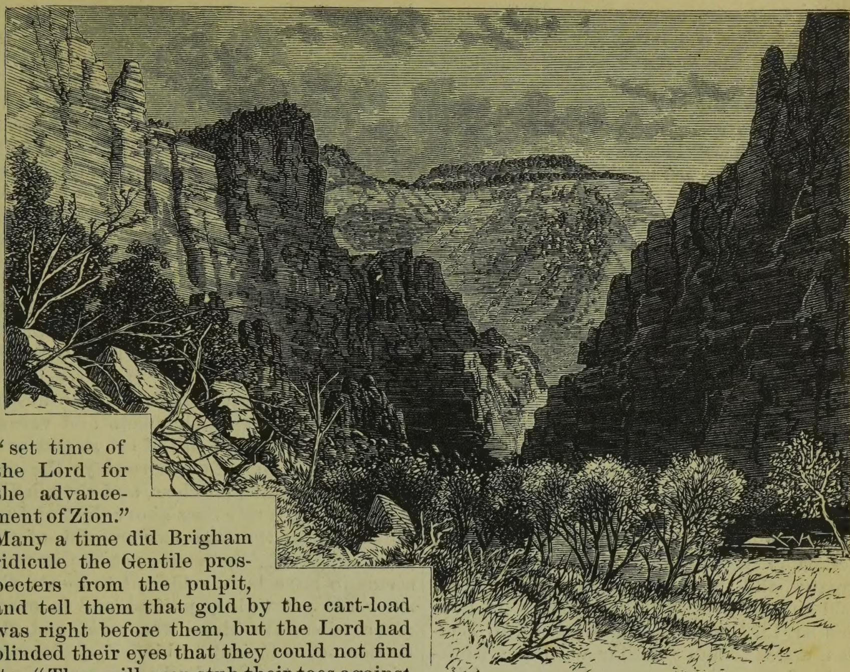
and mineral wealth; a Salt Lake covering 4000 square miles, hot springs and clear streams, mountains of salt and fountains of brine.

Could the traveler go "up in a balloon" to a point 15,000 feet above the general level of Salt Lake Valley, he would see spread out beneath him a tangled mass of mountain chains, sub-ranges, and detached peaks, intermingled with dark depressions marking the valleys, or shining plots of desert, the whole looking not unlike a map of the moon. At first view all seems without place or order: peaks, hills, and valleys thrown together, with rare strips of low and fertile flats. But more careful examination shows certain uniform features: nearly all the mountain chains have a general course from north to south, and all the larger valleys lie in the same direction; the deserts occupy the region farthest removed from the mountains; all the timber is found on the mountains, and thence flow the only streams. Jordan or Salt Lake Valley from this high point of view would appear as an immense trough sloping northward some thirty miles, widening in the same direction like a half-open fan, from a narrow cañon to a valley twenty miles in width.

Some such view I had in September, 1870, from Bald Peak, the highest in the Wasatch Range, nearly 12,000 feet above tide. Eighty miles south of me Mount Nebo bounded the view; its lowest pass forming the "divide" between the waters which flow into this basin and those flowing out with the Sevier into the Great Desert. Below me lay Utah Lake and vicinity, a clear mirror bordered by gray slopes; far down the valley, Salt Lake City appeared upon the plain like a green blur, dotted with white; northward the Salt Lake rolled its white-caps, sparkling in the morning sunshine, while the Wasatch Range, glistening along its pointed summits with freshly fallen snow, stretched away northward till it faded in dim perspective beyond Ogden. A hundred and fifty miles from north to south, and nearly the same from east to west, were included in one view—twenty thousand square miles of mountain, gorge, and valley. From such a point one can realize how little of Utah is of any value for agriculture: only the narrow border of lowland along the streams can be cultivated; all the rest, nineteen-twentieths of the valleys, consists of "bench" and table land, fit only, and that not half of it, for grazing.

Two years after, I visited Southern Utah and Northern Arizona, where a curious contrast is to be noted. In the north the most rugged mountains are relieved by graceful adjuncts; every where there is a gradual ascent from plain to bench, from bench to foot-hill and lower sub-range, and over all is a faint green tinge from timber or bunch grass, or a dreamy haze that softens the rudest outlines. Though even there half or more of the country is a complete desert, yet there is vegetation enough to maintain a feeling of life and growth. But in the south there is a grandeur that is awfully suggestive—suggestive of death and worn-out lands, of cosmic convulsions and volcanic catastrophes that swept away whole races of pre-Adamites. There the broad plateaus are cut abruptly by deep cañons with perpendicular sides, sometimes 2000 feet in height; there is a less gradual approach to the highest ranges, and the peaks stand out sharply against a hard blue sky. The air is evidently drier, there is no haze to soften the view, and the severe outlines of the cliffs seem to frown menacingly upon one who threads the cañons. Needle rocks project hundreds of feet above the general level, while great dikes of hard volcanic rock rise above the softer lime or sand stone—mighty battlements, abrupt and impassable, Pelion upon Ossa, piled as in Titanic war. Again, in the wider cañons or on the level plains one finds detached *buttes*, sugar-loaf in shape, and of every height from fifty to two thousand feet, that appear to have been hurled from the neighboring ranges.

The Wasatch Mountains divide Utah in two nearly equal parts; all that part east of their summit is still the range of the Mountain Utes, while but a little way west of these mountains the country is a complete desert. For these reasons the Mormon Utah consists of a narrow line of settlements down the centre of the Territory: an attenuated commonwealth, rarely more than ten miles wide, but nearly seven hundred miles long, from Oneida, in Idaho, to the Rio Virgen, in Arizona. Geographically, it nearly fills the definition of a line—extension without breadth or thickness. But a few years ago the total population of Utah was confined to the valleys, but since 1870 the mining interest has created a score of little communities on the mountains; and between them and the valley men exists much of the traditional feeling between Lowlander and Highlander, tempered only by the amenities of a necessary commerce. From the first settlement of Utah it was known in a vague way that some ore was to be found there. More than once a piece of galena was loosened from the "croppings" by teamsters while rolling logs down the mountain-sides. Indications of gold were found in Bingham Cañon, and gold sands were worked in the Sevier River, in Juab County, as early as 1861, and returned two or three dollars daily per man. The belief became universal among the Mormons that immense gold ledges were in the adjacent mountains, but not to be revealed till the



NORTH END OF LITTLE ZION VALLEY, RIO VIRGEN.

"set time of the Lord for the advancement of Zion." Many a time did Brigham ridicule the Gentile prospecters from the pulpit, and tell them that gold by the cart-load was right before them, but the Lord had blinded their eyes that they could not find it. "They will even stub their toes against it, and not know what hurt them." When Bishop Simpson visited Salt Lake City, Brigham informed him he could stand in his own door and see where there was more gold than the Saints would ever want to use, "unless it was for the manufacture of culinary vessels, ornamentation, and paving the streets of the New Jerusalem." Still later he preached one of his "inspired" sermons, in which he told the Saints the Gentiles never could or would discover the precious metals. "If they discover them, it will be over my faith." But he assured them when the Lord gave the word, that ledge of "pure gold" would be opened. Many Mormons also claimed to know the whereabouts of this ledge and another equally rich—"three feet thick of solid gold." It was a great subject of exciting discussion in the early mining days. At length one of the knowing ones was prevailed upon to discover the location. One ledge of "pure gold" proved to be crystallized iron pyrites, and the other, "three feet thick," was yellow mica!

Actual work on mines was begun by General Connor's soldiers in 1863 and 1864; and it is worthy of note that the first discovery was by a lady, the wife of a surgeon with the California volunteers.

A picnic had been organized from Camp Douglas to Bingham Cañon, twenty-five miles northwest of Salt Lake City; and during a ramble on the mountain-side this lady, who had a previous knowledge of minerals in California, picked up a piece of rock which she pronounced "float" from a ledge of silver-bearing quartz. The soldiers immediately prospected for the ledge, found it, and located the first mine in Utah. General Connor furloughed his men by detachments to prospect, and in a few months locations were numerous in Bingham, Stockton, and Little Cottonwood. One general difficulty attended all operations. The ore yielded from $30 to $60 per ton in silver, and from thirty to sixty per cent. lead; so it smelted freely, but could not be milled. Thus two or three tons of the crude ore made one ton of base bullion, which contained but $50 or $100 in silver and some 1995 pounds of lead. Refining works were not to be found west of the Missouri; freight across the plains was twenty-five cents per pound, and lead was worth in the East no more than eight or ten cents: result in miners' arithmetic—"Twenty-five into ten goes nary time and nothing over." Further work was postponed till the completion of the railroad and reduction of freights. The good accomplished by these early prospecters consisted in proving that the mines were valuable and the ore easy to smelt; the evil, setting up a number of "floating titles" which long overshadowed later workers and hindered the development of Stockton District for three years after the revival of mining.

In midsummer, 1869, there were no more than a thousand non-Mormons in Utah, of

whom half or more were engaged in "prospecting" for silver mines or developing old locations. In a year the mining population increased to 4000, and it was soon established beyond doubt that Utah was a rich mining country. In one month the Walker Brothers shipped 4000 tons of ore. The early history of the Emma Mine now reads like a romance. Mr. J. B. Woodman had never wavered in his faith that the hill north of Little Cottonwood Cañon contained a rich deposit. He had followed a narrow vein till his means were exhausted, without making a "strike." His faith was infectious, and one or two grocers in Salt Lake City furnished him on credit a hundred pounds of flour and some meat, which he and his partner carried up the cañon, wading through the snow. Before that provision was exhausted, they came upon the upper part of the deposit since known as the Emma Mine. In a month thereafter the most sanguine spoke of it as worth $40,000, whereat the many laughed. Every foot of additional development showed the ore body to be greater, and the property was successively sold and stocked at higher prices. In September, 1872, after it had been sold in London, a gentleman familiar with the workings of the mine presented the following exhibit:

Depth of workings	230 feet.
Breadth of workings	6 to 40 "
Length of workings	475 "
Cubic feet excavated (about)	500,000
Tons of ore extracted	30,000
Tons of waste and third-class ore	15,000
Value of ore	$2,500,000

So small had been the expenses of working, on account of the loose nature of the ore, that $2,200,000 of this had been clear profit. The mine might honestly have been sold for $2,000,000. It was stocked at $5,000,000. The result was a failure to pay dividends on such a capital, a cessation of working, caving in of the mine, a disgraceful lawsuit, and an international scandal. The nation at large has little to ease the smart. In Utah we have one consolation: all the honest work on the mine was done by Gentile residents; all the fraud was perpetrated by men who live outside of Utah, some of them our worst enemies. But we have suffered most of the ill effects. A cloud was thrown upon Utah mines which delayed our progress for two years.

The ore of the Cottonwood mines will doubtless average the richest, including silver and lead, in Central Utah. It carries from $100 to $200 per ton in silver, and from thirty to sixty per cent. in lead. Thus the metal is still at least ninety-six or ninety-seven per cent. lead, and is shipped eastward for separation.

In summer, Cottonwood District is the most delightful of cool retreats; in winter, a lofty snow-bank, with here and there a gray projection. In the winter sunshine it would, but for the occasional patches of timber, present a painfully dazzling expanse of white; and as it is, serious snow-blindness is not uncommon. When a warm south wind blows for a day or two, there is greater danger of snow-slides. In January, 1875, the snow fell there without intermission for eight days, filling the deepest gulches, into which the few stray animals plunged and floundered helplessly. In the circular mountain hollows, with a good growth of timber, the snow drifted from ten to forty feet deep, leaving the largest trees looking like mere shrubs. Distant settlements were quite isolated, and the narrow passes thereto stopped by snow. However, in the best-developed mines work went on underground, all the side chambers and vacant places being stacked full of ore as fast as it was mined. In a few more days the sun came out bright and clear, and though the thermometer rarely rises above the freezing-point during the first two months of the year in the higher camps, yet the warmth seems to have been sufficient to loosen the snow not yet tightly packed, and in every place where the slope was great and the timber not sufficient to bind it, avalanches of from one to a hundred acres came thundering into the cañons, sweeping all before them. One of the largest swept off that part of Alta City, Little Cottonwood, lying on the slope. Six persons were killed outright, either crushed by the timber of their own cabins or smothered in the snow, and many more were buried five or six hours, until relief parties dug them out. One woman was found sitting upright in her cabin with a babe in her arms, both dead. The cabin had withstood the avalanche, but the snow poured in at the doors and windows, and they were frozen or smothered. Thirty-five lives were lost in Utah that winter by snow-slides. Six men were buried in one gulch a thousand feet under packed ice and snow. Search for them was useless. But at length the breath of June dissolved their snowy prison, and the bodies were revealed, fresh and fair as if they had just ceased to breathe.

North of Little Cottonwood, and, like it, opening westward upon Jordan Valley, is the cañon of Big Cottonwood, with a very similar class of mines. Kesler's Peak is the central point of that district, whether for mineral wealth or natural beauty. Far up the cañon is Big Cottonwood Lake and the beautiful little oval vale around it, where the Mormons usually celebrate Pioneers'-day—the 24th of July. Of course the Gentiles select some other spot, and have usually demonstrated at Alta City, Little Cottonwood, on the 4th of July. There, on Independence-day, one finds himself still surrounded by snow-clad peaks, and can mix his patriotic

drinks with water flowing direct from a snow-bank. Often the highest peaks are not bare of snow till the middle of August, and sometimes not till snow comes again; but as "late fall and late spring" is the weather formula for a mountainous country, August, September, and October are the best months for prospecting. South of Alta is the "divide," which leads over to the head of American Fork Cañon—"the Yosemite of Utah." While hardly worthy of such a title, it well deserves a visit, and has the advantage of being accessible in a four hours' ride from Salt Lake City. A narrow-gauge railroad, built by Howland and Aspinwall, of New York, to transport ore, runs down the cañon and connects near Provo with the Utah Southern.

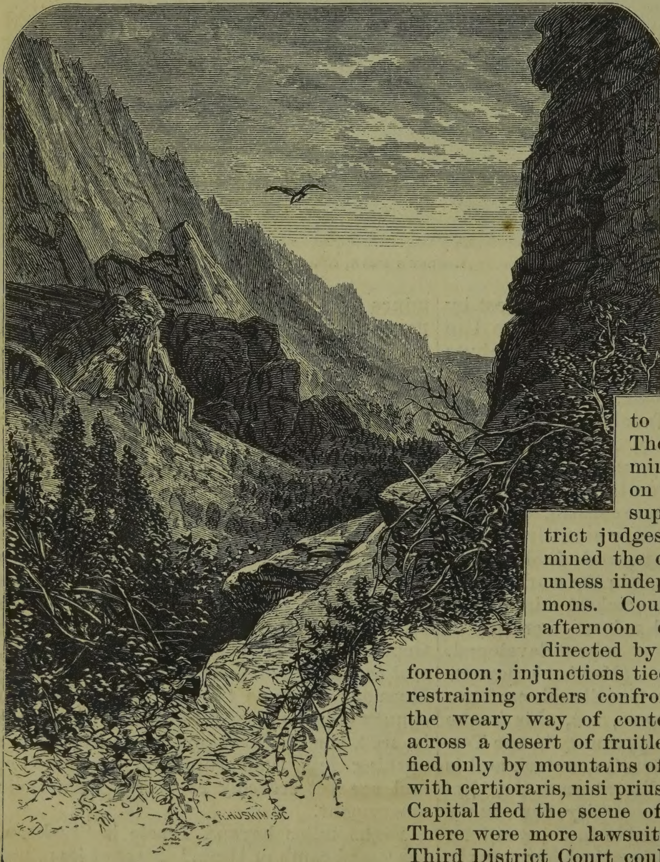
KESLER'S PEAK, BIG COTTONWOOD.

Jordan Valley is bounded on the west by the Oquirrh ("Lost Mountain," in the Ute language), which at the north end abuts sharply on the lake, leaving barely room for railroad and wagon road; and beyond the point we enter upon Tooele Valley, eastern section of Tooele County. This county contains 7000 square miles, and not more than a hundred sections of cultivable land! Of the rest, one-third or more consists of mountains, rugged and barren or scantily clothed with timber and grass, and 4000 square miles of the worst desert in the world. But it contains three of the richest mining districts in the West, and a dozen more which promise equal richness when developed. Hence the agricultural (Mormon) population is small, while the Gentile miners have increased rapidly; hence, too, this is the first, and as yet the only, county in the Territory to pass under Gentile control, and is known in our political literature as the "Republic of Tooele." Tooele City, the county seat, and only considerable town, was long inhabited by the most fanatical Mormons in Utah; and when in 1870 the opening of mines first set the tide of Gentile travel flowing through the place, they resisted change with stubborn tenacity. At length Mr. E. S. Foote, now Representative elect from the county, ventured to set up a Gentile hotel; but they led him a merry dance for a year or two. The City Council (every Mormon settlement in Utah is incorporated) raised his license every quarter, until it took one-fifth or more of his receipts to pay it, and every Gentile who smoked a cigar, ate a dinner, or staid overnight at Foote's was putting from ten cents to a dollar in the city treasury. Still he pulled through; one after another came, and now the flourishing Gentile colony in Tooele have church, school, and social hall of their own, and the young Mormons welcome the change. When the county offices passed into Gentile hands late in 1874, the old Mormons seemed to expect nothing less than ruin and confiscation, and are yet scarcely recovered from their amazement.

Eight miles beyond Tooele is Stockton, the "lead camp of Utah." Most of its mines yield from $20 to $40 in silver and from a

thousand to fourteen hundred pounds of lead per ton. Hence the ore works almost as easily as metallic lead melts; and though long considered the slowest, as it was the oldest, mining town in Utah, with more capital and cheaper transportation, Stockton is steadily growing in importance. Here we enter Rush Valley, an oval some fifteen by thirty miles in extent, with a water system of its own, and cut off from the Great Salt Lake by a causeway some eight hundred feet high. Twenty years ago the centre and lowest point of this valley was a rich meadow, and included in a government reservation six miles square; now the centre of that meadow is twenty feet under water, and a crystal lake eight by four miles in extent covers most of what *was* the reservation. Such is the change consequent on the aqueous increase of late years in this strange country. Three deep cañons break out westwardly from the Oquirrh. In the southern one, known as East Cañon, "horn-silver," or chloride, was discovered in August, 1870; in three months a thousand men were at work in that district. Bowlders were often found lined with chloride of silver which yielded from $5000 to $20,000 per ton. Ophir City, the metropolis, stands in the bottom of a cañon 2000 feet deep, which makes a very singular division of the district. On the south side are *bonanzas* of very rich ore, mostly chloride in a limestone matrix, with little or no admixture of base metal; on the north side are larger bodies of lower grade ore, a combination of sulphides of iron, lead, arsenic, antimony, and zinc, carrying in silver from $30 to $80 per ton, and from twenty to fifty per cent. of lead. From the series of mines on Lion Hill, south side, known as the Zella, Rockwell, etc., have been taken at least $800,000 in silver, leaving an immense amount in sight.

Over the sharp ridge which bounds East Cañon on the north is Dry Cañon, which was the leading camp of Utah in 1874. There one mine yielded three-quarters of a million. In this camp carbonates of lead and silver predominate, all the ore smelting freely. Both cañons are included in Ophir District, which has passed through the three periods destined for all new mining camps. The year 1870 was the era of discovery and high hopes, 1871 of wilder speculation not unmixed with fraud; then came the era of reaction and long-drawn-out lawsuits, which were aggravated by the wretchedly unsettled condition of the Utah courts. It was the era of transition from the old Mormon system of juries directed by priestly "counsel" to the Gentile system. The Saints were determined to retain their hold on the courts, or cut off supplies; the Federal district judges were equally determined the courts should not run unless independently of the Mormons. Courts of equity in the afternoon enjoined proceedings directed by courts of law in the forenoon; injunctions tied up every thing, and restraining orders confronted every body, and the weary way of contending claimants lay across a desert of fruitless litigation, diversified only by mountains of fee bills, and strewn with certioraris, nisi priuses, and writs of error. Capital fled the scene of so much contention. There were more lawsuits impending than the Third District Court could have settled in ten years. At last some of the disputes reached a



AMERICAN FORK CAÑON.

conclusion in court, twenty times as many were compromised, and in 1874 the district entered on the more satisfactory stage of steady work and development. The deepest mine is now down 1400 feet, and the great question as to whether these are permanent fissure veins is being solved in the only way it can be—by digging. The district contains some twelve hundred working miners and about half as many women and children.

Here are some of the most sublime views in Northern Utah. Having visited every peak of the Oquirrh in the summer, business at length took me to Dry Cañon in midwinter. The cañon begins abruptly in a vast amphitheatre, of which the sides rise for 1500 feet at an angle of forty-five; and at the close of a day's climbing, visiting the higher mines, sunset came while we were still upon the summit. Along the Oquirrh every peak was glittering red or dazzling white; then the sun sank beyond the Cedar Mountains, and all Rush Valley was for a moment bathed in a yellow waxy light. Forty miles to the southwest the sharp cañon which leads up to Columbia District seemed to rise out of obscurity, every peak glowing in the ruddy light; far to the north the Salt Lake shone like a sea of quicksilver, and southward East Cañon seemed to deepen rapidly until the houses in Ophir sank out of sight. The mirage on the Great Salt Desert first rose in ghastly gray pillars and fantastic forms, then rolled away like a dissolving cloud. Another minute, and from the point where we had last seen the sun great banners streamed away toward the zenith, first a rosy red, then a pale yellow, and finally a soft purple, which in turn rapidly faded into the deep blue of the sky, as the evanescent twilight gave way to full night. But just before this final transformation, borne upon the evening breeze, came to our ears that strange, mysterious music so often heard at twilight on broad plains or mountain-tops. Some liken it to the distant sound of church bells; but to my ear it has no metallic ring; it is rather like the cry of hounds in full pack, and seems at times exactly overhead, so that I involuntarily glance upward. The superstitious Cornish miners say that it is the cry from the souls of unbaptized infants, who after death must wander in the air till the Judgment-day! As it dies away it does sound singularly like the cry of a lost child, but gradually lengthens out to a long monotonous wail in the minor key. The cold air settling rapidly down into the cañons after night-fall produces the tone, as it rushes through the crevices in the rock. In less than half an hour after sunset the air is bitter cold, and beautiful as the mountains are by moonlight, we hasten down the steep trail to the comforts of a warm cabin and miner's supper.

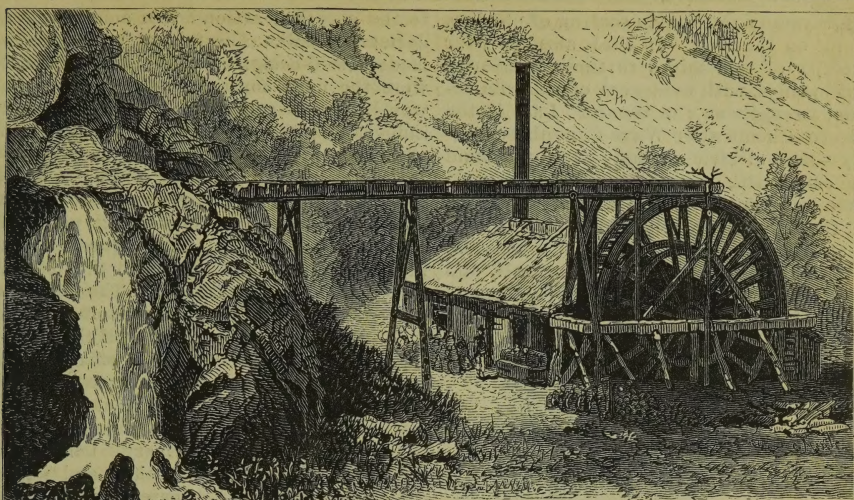
From the eastern slope of the Oquirrh, Bingham Cañon opens upon Jordan Valley; at the south end of the range is Camp Floyd District, and a little farther down is Tintic. This ends the list of developed districts in Northern Utah. The Utah Lake Valley, which drains by way of the Jordan into the Salt Lake, is bounded on the south by Mount Nebo, and south of that we enter upon the more benighted regions of polygamy. There Mormonism may still be seen in something like its primeval purity. North of Provo, and particularly about Salt Lake City, the Saints have been affected by association with Gentiles, and partially lost the faith. Even in the south polygamy is weakening; but on the main road to the southern mines may still be seen two towns without parallels in America—Taylorsville and Winnville. Two worthy Mormon patriarchs, Elder Taylor and Elder Winn, have each taken numerous "wives," and each of their sons has done the same. The result is two villages, in one of which all the inhabitants are Taylors, and in the other all Winns. The Taylors have been the better Saints, and outnumber the others two to one, which is very disheartening to the Winns. Old man Winn is reported to have said to an official who visited him not long ago that life to him was but a weary desert, and at times he felt like fainting by the way-side. At other times he declared that never more would he go through the Endowment House and take another young wife, "for that old Taylor can just naturally raise two children to my one." It is ever to be regretted that the Centennial Commissioners could not have secured one or both of these families for our great show of native products. The effete despotisms of Europe have nothing of the sort.

At the northern termination of Iron Mountain the stage road turns southwest, by way of Fillmore and Beaver, to Pioche, Nevada; but another road leads to the left, between Iron Mountain and the Wasatch, to the Sevier mines, which lie two hundred miles straight south of Salt Lake City. Thither I went in midsummer, 1869, traveling up the valley of the Sevier, which had been abandoned by the Mormons on account of the Indian war. With no dread of the savages, myself and mining friends thought it a most delightful and romantic trip. For three days after leaving Iron Mountain we journeyed leisurely through a region abounding in game and with the very perfection of climates. It is that of a high altitude in a low latitude, pleasantly cool in summer and not too cold in winter. Sevier District has an abundance of timber and water-power, but the mines are "lean in silver and rich in lead," and can not profitably be worked until the railroad, now slowly stretching southward, reaches that vicinity. Then they will

employ a large number of men. Twenty miles west of Sevier District lies Beaver Valley, and west of that the Beaver Mountains, in which has grown up a prosperous mining community. The Rollins Mine in that section has been worked for lead occasionally by the Mormons ever since 1852, and long before that by Spaniards or Indians. Of the lead from this mine the Mormons made bullets, which retailed every where through the mountains at thirty cents per pound. They contained at least $50 per ton in silver, and some gold, which no one knew or took account of. Out of the same mine came the lead used to fight the United States army in 1857. Now it is the property of a Federal official and his partner, who are making it serve better and more patriotic purposes. Such is the richness of the Beaver mines that they are developing rapidly without the aid of the railroad, which, we are yearly promised, will reach them next year. That county contains almost every mineral useful to man—silver, iron, copper, coal, kaolin, and fire-clay of most excellent quality. With all this the climate is singularly mild and equable. In summer I found Beaver City a little cooler than Salt Lake Valley, as it is nearly one thousand feet higher, though two hundred miles farther south. The winters are about like those of Northern Georgia. The fertile valley on Beaver Creek, with a large Mormon population, can furnish provisions for a community of 50,000; and with the extension of the railroad to that point, it will doubtless be the richest region in the south, the metropolis of Southern Utah and Northern Arizona.

Utah now contains ninety mining districts and some 10,000 people engaged in mining. The mines and improvements are valued all the way from fifteen to thirty million dollars, and the annual yield of lead, silver, and gold has reached five millions. All this interest has grown up since 1870; and if any man is inclined to believe the silly slander sometimes put forth by Eastern apologists for the Mormons that the Gentiles in Utah are "a set of carpet-baggers who have no interests at stake in the Territory," I would ask him to consider that the value of assessed property in Utah increased from $9,000,000 in 1870 to $21,548,348 in 1873—an increase of the property to the extent of 140 per cent. when the "carpet-baggers" had been at work three years. Only the machinery and other improvements at the mines are included in the assessment, not the mines themselves. The ore and bullion exported in 1873 amounted to $4,523,497; all agricultural products exported to $392,-315; and the total value of all agricultural products was $4,520,700—that is, the ten thousand miners turned out a little more actual wealth than all the rest of the population, and exported more than twelve times as much. The miles of railroad increased from 38 in 1870 to 220 in 1874; and the assessed value of rail-

OLD MILL, AMERICAN FORK CAÑON.



AN ARRASTRA, OR STONE-PULVERIZER, IN EAST CAÑON.

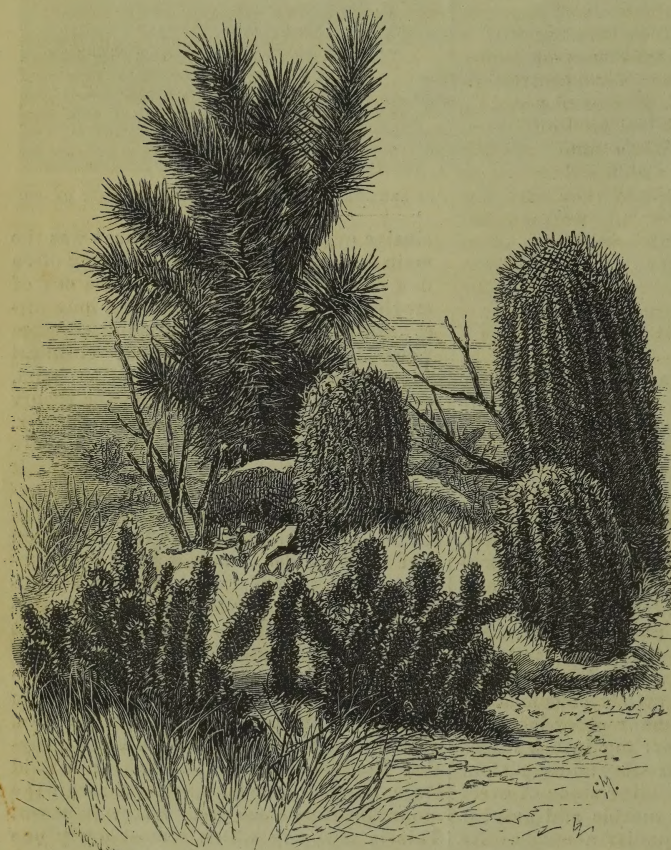
roads during the same period rose from $480,000 to $2,219,000. I do not object to the Mormons lying about us—that is part of their mission; but I think it a little unkind for some Eastern people to help them.

Copper is found in vast quantities in Tintic and some other districts, but the reduction thereof has not made much progress. Bismuth ore is found in the southern counties in abundance. Graphite, black-lead, native sulphur, alum, borax, carbonate of soda, and gypsum are widely disseminated, and beds have been discovered that will richly pay for working. Salt is so plentiful as scarcely to be an article of commerce. Near the lake and in many other localities it can be had for shoveling into a wagon and hauling home. Fire-clay and sandstone are abundant, as is building stone of every description, including marble and granite. Kaolin of the finest quality abounds. All the ochres used for polishing, pigments, and lapidary works are in inexhaustible supplies. The Territory will not average one acre in forty fit for agriculture, but nearly all the rest is valuable for some kind of mineral.

Scientific imagination and unlearned conjecture have alike been exhausted in the attempt to account for the formation of our mineral lodes. As the indications differ in different districts, the empirical explanations range over the whole line of possibilities, from fire and volcanic action to cold water, salt, and chemical reaction. In many of the mines of Utah I have seen most conclusive evidence that intense heat was the main factor in lode formation, having often dug cinders and ashy coagulations out of crevices in the mine, only to find long afterward that science had pronounced them "conclusive evidences of electro-chemical action." In Colorado, on the other hand, my observations inclined me to the theory that water was the main factor. Finally, and after some years' practical experience in both Territories, I determined to study it out; and after a vigorous six months' campaign with Dana, Raymond, Werner, and Silliman, I deliberately came to the conclusion that what we *don't* know about the formation of mineral veins would make a big science; also that, except from practical experience, one man knows *about* as much what is in the ground out of sight as another.

If the reader will bear in mind that the question is as yet undecided, it will do him no harm to examine the principal theories, of which there are four. First is the Eruption theory—that the mineral, in a fluid state, burst a passage upward through the mountain from some great reservoir below. This is a theory which almost every one adopts on first examination of mines, and in no long time abandons. Second is the Aqueous Deposition theory—that the mineral was originally in solution in shallow seas or brackish lakes, and settled into the crevices as the general level changed and the mountains were elevated. This theory is held by few, if any, scientific men at present. The Sublimation theory is that the mineral rose with vapor and hot water, and was cooled and condensed upon the walls of pre-existing crevices. Valuable evidence for this theory is claimed to have been found in Georgia, where the hot waters issuing from the vicinity of a mine have left within

a few years a noticeable coating of precious metal on the rock. In Utah, also, the near vicinity of rich mines to those wonderful hot springs, with evidences of volcanic action, strengthens the theory. Last is the Electro-Chemical or Wave-Convulsion theory—that electric currents passing around the earth, with an occult action in the rock, have "concentrated" the ore particles from all the adjacent rock into the vein. I shall not elaborate this theory, for two reasons: I do not fully understand it myself, and know but two men in America who do, and judge, therefore, it would not be clear to the general reader. In Colorado this theory is widely accepted; in Utah the tendency of experienced thinkers is toward the Sublimation theory.



CACTUS GROWTH ON DESERT SOUTH OF ST. GEORGE.

When I say that the non-Mormon population, which did not exceed 1000 in 1869, now numbers at least 15,000, and that four-fifths of these are men, the reader will doubtless feel curious as to the effect on Mormonism. The first effect, of course, was a furious effervescence—a social phenomenon similar to the chemical action when acids rouse a dormant alkali. The Saints (which is the modest self-designation of the Mormons) were the most conservative people in the world, the new-comers the most restless and innovating; the Saints complete devotees of a theocracy, the Gentiles furiously democratic; the former perfectly willing to have all their voting done by a priesthood, the latter determined on organizing political parties and discussing public questions as in the communities from which they came. Of course there was trouble. The Mormon Church officials appoint all the Territorial officers, and then have the people elect them by a unanimous vote. Every ballot is marked and numbered, and if, as rarely happens, any Saint votes against the Church ticket, he (or she!) is promptly disciplined. A gentleman who was present and saw it, states that John D. Lee, the butcher of Mountain Meadows, stood at the polls in his town and cast three hundred and fifty votes—for himself and each of his eighteen wives, for his thirty sons and their wives, for his daughters and their husbands, and for all the neighbors who sent their ballots along by him! The Gentiles paid more than half the taxes, but had no voice in the government. The Saints had absolute control of all the courts and juries, and laughed at those who talked of punishing Lee and his fellow-assassins. The first fight of the Gentiles was against the Mormon Probate Courts. In this they were victorious before the Supreme Court of the United States, and now only the United States District Courts have general jurisdiction. But the Saints still have a majority of the jury; so the Mountain Meadows assassins can be brought to trial, but can not be convicted. Meanwhile free speech and a free press were established.

Eight years ago we were hedged in at every point. There was literally no safety or liberty for a non-Mormon here, except in silence and submission. Z. Snow, Esq., attorney for the Church, gave notice, in his speech before the United States Court, that if the Mormon Probate Court were not allowed criminal jurisdiction, "streams of blood would flow in the streets of this city." Brigham Young I have repeatedly heard curse every official here, announce that they could only stay by sufferance, and had no legal rights here whatever. The change cost the blood of some good men. Eight years ago we published our little daily paper in the upper story of a stone building, with a hatchway ready to be thrown open at any moment to cut off a mob; and when the editor went out at night he took the middle of the street, and kept his hand on his revolver. Now there is not a valley in Utah so remote but a man may speak, write, or print what he pleases, and they dare not touch him. The first Gentile who married a Mormon's "plural" wife was shot dead on Main Street. Now such a marriage is as safe in Utah as it would be in Ohio. The first Gentile who ventured to contest a case with the city was brutally murdered by a band of the "secret police." Now such a case can be tried on its merits with perfect safety.

A Liberal party has been organized, and cast 5000 votes in 1874; it controls one county and half a dozen towns, and if Congress could only be persuaded to guarantee us a free ballot, would soon have a healthful minority in the Legislature. Three things the Liberals intend to have, and will keep up the fight till they get them: a free ballot, free trade, and a system of accountability among public officials. But, aside from these, there is an irreconcilable difference between theocracy and republicanism; and no matter how able the officials the President sends to Utah, the trouble will continue all the same till the question as to which is to be paramount is settled. I know many of the young Mormons are delighted with the change; the old ones resist it most stubbornly, and with a great deal of ingenuity. Congress ought to give the Territory an amended jury law and a free ballot, then the minority would hold its own and increase.

As to polygamy, I am sure it is on the decline. Indeed, there has been no subsequent period in Mormon history when there were so many polygamous marriages as from 1852 to 1857. The young people are disgusted with it. One phase of the subject is especially repulsive—the mixtures of blood-relationship. Some cases within my knowledge have given rise to consanguineous puzzles that will bother the Master in Chancery, if the estates ever get into court.

J. H. Beadle

HAYDON AND HIS FRIENDS.

BENJAMIN ROBERT HAYDON was born at Plymouth, in Devonshire, England, January 26, 1786. Sixty years after, borne down in the weary struggle of life, he lay dead in his painting-room in London, shot through the brain by his own hand. Three months before his death, while still somewhat hopeful of success in his last effort, he had written in his journal, "It is glorious to fight a *last* battle—*nous verrons*." He also wrote an epitaph which he wished inscribed on his tombstone when the time came. It embodies his own estimate of his career:

"Here lieth the body of BENJAMIN ROBERT HAYDON, an English Historical Painter, who, in a struggle to make the People, the Legislature, the Nobility, and the Sovereign of England give due dignity and rank to the highest Art, which had ever languished, and until the Government interferes will ever languish in England, fell a victim to his ardor and his love of country: an evidence that to seek the benefit of your Country, by telling the truth to Power, is a crime that can only be expiated by the ruin and destruction of the man who is so patriotic and imprudent. He died believing in Christ as the Mediator and Advocate of Mankind.

"'What various ills the Painter's life assail—
Pride, Envy, Want, the Patron, and the Jail.'"

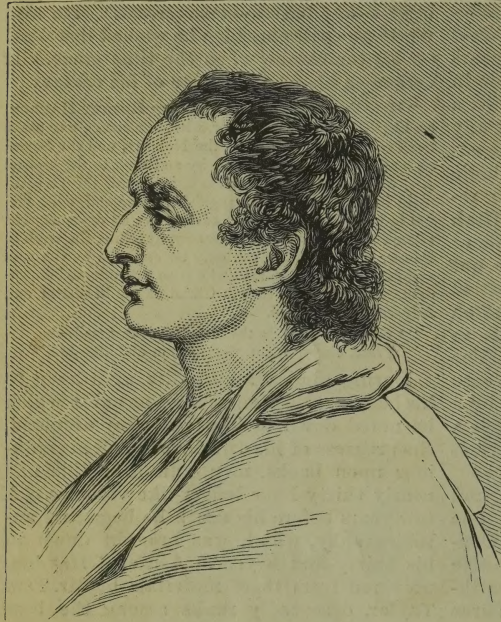
During almost all his life, and down to his last day, Haydon kept a journal in which he noted down incidents as they occurred, the progress of his own labors, and his opinions upon books, men, and art; this fills nearly thirty huge ledger-like volumes. A few years before his death he began an autobiography, which was brought down to his thirty-fourth year. A life of Haydon, prepared from these materials by Mr. Tom Taylor, deservedly ranks among the best works of its class.* During the present year a son of the painter, an officer of the British navy, has put forth a memoir of his father.† This work, while serving to revive interest in the subject, adds little to our knowledge of it. Mr. Frederick Haydon frankly acknowledges that he is "neither a painter nor a literary man; her Majesty's royal navy does not instruct the midshipmen in literature or art." The memoir is unsatisfactory as a whole, although it contains some characteristic anecdotes; the correspondence has little of special interest; the so-called table-talk consists mainly of bits from Haydon's journal, many of which had already been given by Mr. Taylor, to whose work we must still mainly look for information as to its subject. Neither book enables us fairly to judge of Haydon's place in art, though there are not

* *Life of Benjamin Robert Haydon, Historical Painter, from his Autobiography and Journals.* Edited by TOM TAYLOR, Esq. In two volumes. New York: Harper and Brothers.

† *Benjamin Robert Haydon:* Correspondence and Table-Talk; with a Memoir by his Son, FREDERICK WORDSWORTH HAYDON. In two volumes. London: Chatto and Windus. 1876.

a few, and their number seems to be increasing, who assign to him the foremost place among English historical painters.

Haydon was the only son of a prosperous printer and stationer, who wished him to engage in and succeed to the business. He received a good education, learned to draw cleverly, and resolved to become a historical painter, although he had never seen a tolerable picture or sculpture, and knew nothing of art beyond what he had learned from engravings, and from Reynolds's *Discourses*. To his wish there was an obstacle which one would have supposed insuperable. In his sixteenth year he was attacked by an inflammation of the eyes which rendered him for a time wholly blind; and when he at length partially recovered, he "found that his natural sight was gone." As we understand it, in addition to permanent weakness, his eyes had lost their normal power of adapting themselves to different distances. His son thus describes his manner of working at his best:



BENJAMIN ROBERT HAYDON.

"His natural sight was of little or no use to him at any distance, and he would wear, one pair over another, sometimes two or three pairs of large round concave spectacles, so powerful as greatly to diminish objects. He would mount his steps, look at you through one pair of glasses, then push them back on his head, and paint with his naked eye close to the canvas. After some minutes he would pull down one pair of his glasses, look at you, then step down, walk slowly backward to the wall, and study the effect through one, two, or three pair of spectacles; then, with one pair only, look long and steadily in the looking-glass at the side to examine the reflection of his work; then mount his steps, and paint again. Without his glasses he could see nothing distinctly."

The boy was not disheartened by this infirmity of vision. "I can see enough," he said; "and see or not see, I will be a painter; and if I am a great one without seeing, I shall be the first." He might have gained greater confidence from the example of the great composer, the deaf Beethoven. Finding him bent on his purpose, his father gave a reluctant though not ungracious consent that he should go up to London and study in the Academy. He was then a slender but athletic youth of nineteen, with aquiline features, ruddy complexion, bluish-gray eyes, and black curly hair, which early grew white and thin, and in time left him almost bald.

The morning after his arrival he rushed to the exhibition, and looked about for historical paintings, of which he had never seen one. The most admired paintings of that year were the "Gil Blas" of Opie and the "Shipwrecked Sailor Boy" of Westall. "I'm not afraid of you," was his self-confident comment. The next day he bought casts of the head of Laocoon, and of hands, arms, and feet, and before night was hard at work drawing from the round and studying anatomical plates. The first Sunday he went to church, fell on his knees, and prayed to God to bless his efforts to reform the national taste in art. We think that during his whole life he never began a picture, unless it were a portrait, without fervently imploring the Divine blessing. For three months he worked from early dawn until far into the night, scarcely speaking to a human being. "I wanted no guide," he says. "To apply myself night and day, to seclude myself from society, to keep the Greeks and the great Italians in view, to endeavor to unite form, color, light, shadow, and expression, was my constant determination. I was resolved to be a great painter, to honor my country, to rescue art from that stigma of incapacity which was impressed upon it."

At length he bethought himself of a letter of introduction which he had brought to Mr. Prince Hoare, an amiable gentleman, who, failing to make himself a painter, remained a connoisseur and friend of artists. Hoare gave him a letter to Northcote, a Plymouth boy, who had been successful in London as a portrait painter. The old man peered sharply through his spectacles, glanced over the letter, and said, in the broad Devonshire dialect, which he had not got rid of during